CLAIMS

What is claimed is:

1. (Currently Amended) A method for determining [[a]]an inconsistency ~~defect~~ characteristic of a composite structure, the method comprising:

determining a first distance from a first reference point of the composite structure to [[a]]an inconsistency ~~defect~~;

determining a second distance from a second reference point of the composite structure to the inconsistency ~~defect~~;

using the first and second distances to establish a reference area of the composite structure; and

considering each inconsistency ~~defect~~ detected within the reference area and producing therefrom [[a]]an inconsistency ~~defect~~ characteristic representative of the composite structure.

2. (Currently Amended) The method of claim 1, wherein considering each inconsistency ~~defect~~ comprises summing all of the inconsistencies ~~defects~~ detected within the reference area to produce a total inconsistency ~~defect~~ count for the reference area.

3. (Currently Amended) The method of claim 2, further comprising dividing the total inconsistency ~~defect~~ count by the reference area to produce ~~a~~ an inconsistency ~~defect~~-per-unit area of the reference area.

4. (Currently Amended) The method of claim 3, further comprising comparing the inconsistency ~~defect~~-density-per-unit area to a maximum allowable inconsistency ~~defect~~-density-per-unit area.

5. (Currently Amended) The method of claim 1, wherein considering each inconsistency ~~defect~~ comprises:

determining a width for each inconsistency ~~defect~~ detected within the reference area; and

summing the widths of the inconsistencies ~~defects~~ within the reference area to produce a width total for the reference area.

6. (Currently Amended) The method of claim 5, further comprising dividing the width total by the reference area to determine a cumulative inconsistency ~~defect~~ width-per-unit area of the reference area.

7. (Currently Amended) The method of claim 6, further comprising comparing the cumulative inconsistency ~~defect~~ width-per-unit area to a maximum allowable cumulative inconsistency ~~defect~~ width-per-unit area.

8. (Currently Amended) The method of claim 5, wherein determining a width for each inconsistency ~~defect~~ within the reference area comprises:

selecting, from a digital image of at least a portion of the composite structure including the reference area, a pixel set for each inconsistency ~~defect~~ within the reference area representing the width of the corresponding inconsistency ~~defect~~;

determining a pixel count for each selected pixel set; and

correlating each of the pixel counts with correlation data to determine the corresponding widths of the inconsistencies ~~defects~~ within the reference area.

9. (Original) The method of claim 1, wherein determining a first distance comprises:

determining a linear velocity of a material placement head unit; and

using the linear velocity to determine the first distance.

10. (Currently Amended) The method of claim 9, wherein using the linear velocity comprises:

determining elapsed time between when a course started and when the inconsistency ~~defect~~ is detected along the course; and

multiplying the linear velocity by the elapsed time.

11. (Currently Amended) The method of claim 9, wherein using the linear velocity comprises:

determining elapsed time between when a first inconsistency ~~defect~~ is detected along a course and when a second inconsistency ~~defect~~ is detected along the course; and

multiplying the linear velocity by the elapsed time.

12. (Original) The method of claim 9, wherein determining a linear velocity comprises:

determining an angular velocity of a compaction roller of the material placement head unit; and

multiplying the angular velocity by a circumference of the compaction roller.

13. (Original) The method of claim 12, wherein determining an angular velocity comprises detecting, counting, and establishing frequency of transitions between contrasting portions of a code ring coupled for common rotation with the compaction roller.

14. (Currently Amended) The method of claim 1, wherein determining a first distance comprises:

counting revolutions of a compaction roller from course start to detection of the inconsistency ~~defect~~; and

multiplying the counted revolutions by a circumference of the compaction roller.

15. (Currently Amended) The method of claim 14, wherein counting revolutions comprises detecting and counting transitions between contrasting portions of a code ring coupled for common rotation with the compaction roller.

16. (Original) The method of claim 1, wherein determining a second distance comprises:

summing courses completed to produce a total completed course count; and

multiplying a predetermined course width by the total completed course count.

17. (Original) The method of claim 16, wherein summing completed courses comprises tracking receipt of signals from a machine load cell indicating whether pressure is being applied to a compaction roller.

18. (Original) The method of claim 1, wherein determining the second distance comprises:

selecting, from a digital image of at least a portion of the composite structure including the second distance, a pixel set representing the second distance;

determining a pixel count for the pixel set; and

correlating the pixel count with correlation data to determine the second distance.

19. (Original) The method of claim 1, wherein the reference area comprises a region of the composite structure bounded by the first and second distances.

20. (Original) The method of claim 1, wherein the reference area comprises a region of the composite structure bounded by predetermined linear and lateral distances.

21. (Currently Amended) The method of claim 1, further comprising implementing a user interface for displaying inconsistency ~~defect~~ data and for allowing at least one user input.

22. (Original) The method of claim 1, further comprising:

importing a part model of a composite structure;

overlaying a course grid on the part model; and

displaying to a user the part model and course grid.

23. (Original) The method of claim 22, further comprising:

repositioning the course grid overlay when a new ply is started; and

displaying to a user the part model and the repositioned course grid overlay.

24. (Currently Amended) The method of claim 1, further comprising:

communicating with an inspection system inspecting the composite structure for inconsistencies ~~defects~~.

25. (Currently Amended) A method for determining [[a]]an inconsistency ~~defect~~ characteristic of a composite structure, the method comprising:

determining a linear velocity of a material placement head unit along a course being laid;

using the linear velocity to determine a linear distance from a first reference point along the course to [[a]]an inconsistency ~~defect~~ of the composite structure; and

determining a lateral distance from a second reference point of the composite structure to the inconsistency ~~defect~~.

26. (Original) The method of claim 25, wherein determining a linear velocity comprises monitoring revolutions of a compaction roller of the material placement head unit.

27. (Original) The method of claim 25, wherein determining a linear velocity comprises:

determining an angular velocity of a compaction roller of the material placement head unit; and

multiplying the angular velocity by a circumference of the compaction roller.

28. (Original) The method of claim 27, wherein determining an angular velocity comprises detecting, counting, and establishing frequency of transitions between contrasting portions of a code ring coupled for common rotation with the compaction roller.

29. (Original) The method of claim 25, wherein determining a lateral distance comprises:

summing courses completed to produce a total completed course count; and

multiplying a predetermined course width by the total completed course count.

30. (Original) The method of claim 29, wherein summing completed courses comprises tracking receipt of signals from a machine load cell indicating whether pressure is being applied to a compaction roller of the material placement head unit.

31. (Original) The method of claim 25, wherein determining a lateral distance comprises:

selecting, from a digital image of at least a portion of the composite structure including the lateral distance, a pixel set representing the lateral distance;

determining a pixel count for the pixel set; and

correlating the pixel count with correlation data to determine the lateral distance.

32. (Currently Amended) A method for determining [[a]]an inconsistency ~~defect~~ characteristic of a composite structure, the method comprising:

determining a linear velocity of a material placement head unit along a course being laid by monitoring revolutions of a compaction roller of the material placement head unit;

using the linear velocity to determine a linear distance from a first reference point along the course to [[a]]an inconsistency ~~defect~~ of the composite structure;

determining a lateral distance from a second reference point of the composite structure to the inconsistency ~~defect~~;

using the linear and lateral distances to establish a reference area; and

summing inconsistencies ~~defects~~ within the reference area to produce a total inconsistency ~~defect~~ count for the reference area.

33. (Currently Amended) The method of claim 32, further comprising dividing the total inconsistency ~~defect~~ count by the reference area to determine [[a]]an inconsistency ~~defect~~ density-per-unit area of the reference area.

34. (Original) The method of claim 32, wherein monitoring revolutions of a compaction roller comprises detecting, counting, and establishing frequency of transitions between contrasting portions of a code ring coupled for common rotation with the compaction roller.

35. (Currently Amended) A method for determining [[a]]an inconsistency ~~defect~~ characteristic of a composite structure, the method comprising:

determining a linear velocity of a material placement head unit along a course being laid by monitoring revolutions of a compaction roller of the material placement head unit;

using the linear velocity to determine a linear distance from a first reference point along the course to [[a]]an inconsistency ~~defect~~ of the composite structure;

determining a lateral distance from a second reference point of the composite structure to the inconsistency ~~defect~~;

using the linear and lateral distances to establish a reference area;

determining a width for each inconsistency ~~defect~~ within the reference area; and

summing the widths of the inconsistencies ~~defects~~ within the reference area to produce a width total.

36. (Currently Amended) The method of claim 35, further comprising dividing the width total by the reference area to determine a cumulative inconsistency ~~defect~~ width-per-unit area of the reference area.

37. (Original) The method of claim 35, wherein monitoring revolutions of a compaction roller comprises detecting, counting, and establishing frequency of transitions between contrasting portions of a code ring coupled for common rotation with the compaction roller.